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Comment: The full names of some of the German scientists mentioned in the report are as follows: Fritz Matheis, Helmut Groettrup, Johannes Hoch, and Kurt Magnus. The correct spellings of two of the Russian names are: 25X1

Voskresenskiy for Voskresteensk
Kuznetsov for Kusnitsov
Khalamov for Halamov
Pobedonostsev for Popedenossov
Vasilyev for Vassiliev
Ioffe for Joffe

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COUNTRY USSR REPORT 25X1

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TOPIC Activities at Branch Institute No 1 in Ostashkov of NII 88 and at the Kapustin Launching Base 25X1

EVALUATION PLACE OBTAINED 25X1

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list on ditto

REMARKS

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Activities of the German Group from November 1946 to September 1947.

1. With the arrival of the group of German experts at the NII 88 Branch Main 25X1
Department No 5 in charge of the testing of ground equipment and firing accessories as well as of preparations for the launching. A short time later, Main-Department No 5 was renamed Sector 8 which in turn was disbanded in early 1948. The personnel of the department included Fritz Bergmann and Siegfried Bergmann, Bujak (fnu), Filter (fnu), Matteis (fnu), Pehle (fnu), Pflanze (fnu), Rudiger (fnu), Scholz (fnu), Techter (fnu) and Wohlfahrt (fnu).

2. By a work order of 1 December 1946, the compiling of training material, subject "The Motorized V-2 Battery in combined combat with an FMS train" was requested. FMS was the abbreviation for "Fahrbare Meteorologische Station" (mobile meteorological station), the former German cover

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designation for the rocket launching train. This train with 100 axles carried all equipment and instruments for the preparation and launching of an A-4 missile. This train also included a coach car for the crew, a first-aid car, a laboratory car and a kitchen car. In about mid-June 1947, the study was turned over and translated at Ostashkov, to be used as theoretical training material for troops.

3. 25X1

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a new project was worked out. A study on "Principles for the establishment of an experimental rocket launching base with all equipment for missiles with a range of up to 2,000 km". No location was given for the launching base to be constructed. 25X1

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The study was completed and turned over to the Soviets on 1 April 1947. 25X1

4.

A German fire control tank was also available at the plant. During the reconstruction of the T-34, Soviet personnel were trained for the first time in the operation of a fire control tank. There were two experimental crews at NII 88, one was made up of plant personnel and the other one made up of Soviet Army personnel. Until late September these crews were trained five hours per day in the plant area. The training included burning tests conducted in a gravel pit.

Launching Tests at the Kapustin Experimental Launching Site from 8 October to 22 December 1947.

6. The equipment moved to Kapustin for launching tests included:

a. One FMS train with the Soviet Army experimental crew. This train was already at Kapustin when the other trains arrived there.

b. One FMS train with the Soviet crew of NII 88, the German Group and the Soviet staff.

c. One equipment train with 10 special cars each carrying one A-4.
   - 2 trailers for the missiles
   - 1 compressor
   - 2 mobile launching tables
   - 1 measuring car
   - 1 car carrying the cables
   - 4 x 6,000-liter fuel trucks, empty, for oxygen
   - 2 x 3,000-liter fuel trucks, empty, for alcohol

The ground equipment furthermore included:
   - 6 Vidal-type vehicles for road transport of A-4 missiles
   - 1 railroad tank car for oxygen with a capacity of 20,000 liters
   - 1 Strabo-type crane
   - 1 fire engine
   - 1 fire ladder with working platforms
   - 1 generator car

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6. The installations at Kapustin were not yet completed and the railroad connection to the eastern side tracks was still being laid. The construction period was allegedly four months. With a labor force of about 10,000 men thrown into action, the launching base was completed about 8 days after arrival of the German group, and preparations for the launching tests could be started. 25X1 the single-track standard gauge railroad line, about 1.5 km long, was laid without subgrade on the plain steppe, and that about 1,000 machine tools from Peenemuende, the assembly shop of test stand No 7 and other parts of the tests stand as well as gauntry cranes etc were piled up in great disorder at either side of the track. The German experts believed that a second Peenemuende was to be established at Kapustin.

7. The assembly shop at Kapustin was adequately equipped for the testing of two units in horizontal position and was large enough to store 6 missiles. The railroad track extending into the shop was not yet connected to the other tracks. Several concrete areas, each about 8 x 8 m, were located between the spur track, the technical office and the billets. The purpose of these concrete platforms was not determined. They were possibly foundations for new buildings. The long gorge at the launching base offered possibilities for the construction of additional test stands.

8. The launching tests were conducted in order to train the Soviets for combat action of a V-2 battery. Competence disagreements were finally settled and it was decided that the Soviet Army was to be in charge of the launching performance, and that Colonel Korolov, chief of the construction bureau for guided missiles at Plant No 88 was to be supervisor; Groettrup (fnu) was to be in charge of the general organization. Lieutenant Colonel Voskresteenski was chief of the army unit performing the launching. The unit included 120 men, 15 of whom belonged to the launching crew. Korolov had to give the initial order for the launching, consequently ordered the preparation of the missile. The German group supervised the orders given, and saw that they were carried out correctly. All manipulations done by the Soviet soldiers were supervised and very often corrected. When important visitors were present, the orders otherwise received from Voskresteenski were given directly 25X1 to eliminate a loss of time. Instead of the 45 minutes previously required by the Germans to prepare one missile for launching, the Soviets at first needed 4 to 5 hours and later 1 ½ to 2 hours. 25X1 Voskresteenski would eventually be able to handle the launching process without German help. Kalanov (fnu), a Soviet who was always present during the technical tests, was probably assigned to take over this field.

9. The missiles were fired in a direction of about 30 degrees or on a line passing west of Lake Elton. UNCODED s had been 25X1 the firing direction even when a more densely 25X1 populated area started at a range of 500 km in this direction, 25X1 the target area at a range of 250 km from the launching 25X1 point had been evacuated.

the range could be extended 25X1 to 500 km as well as to 1,500 km, but that the direction of fire would have to be changed in that case. The activities started with the preparation of the test stand and of the other ground equipment and the continued training of the Soviet personnel.

Launching Activities.

10. Thirteen missiles were launched at a range of 250 km.

(1) An original A-4, no incident

(2) An original A-4; as result of a control defect, the missile hit the ground at a point about 8 km from the launching site.

(3) An A-4 missile assembled at Plant 88. Due to a control defect the missile came down about 45 km from the launching point from an altitude of about 4,000 m.

(4) An original A-4, no incident.

(5) An A-4 assembled at Plant 88. At a distance of about 300 m from the launching site the missile crashed from an altitude of 1,000 m with exploded tail unit caused by a torn O_2 pipe, presumably as a result of worn cut material.

(6) An original A-4, no incident.

(7) An original A-4, no incident.

(8) An original A-4, no incident.

(9) An original A-4, no incident.

(10) An original A-4, no incident.

(11) An original A-4, no incident.

(12) An A-4 assembled at Plant No 88, no incident.

(13) An original A-4, no incident.

Dr. Hoch (fnu) and Dr. Magnus (fnu) arrived by plane, to investigate on the cause of the control failures which occurred at the second and third experiment. After Dr. Hoch detected a basic mistake in the direction governor which was eliminated by the installation of new condensers, no further control failures occurred.

11. In addition to the 10 A-4 missiles shipped to Kapustin by the equipment train, 8 more units were brought from Plant No 88 by a special equipment train. Of these 18 missiles 13 were launched and five A-4 units remained in Kapustin after the launching tests were completed. It was believed that a total of 24 A-4 units had been shipped from Germany to the USSR of which 10 were assembled there.

12. On 10 of the missiles launched, the cut off was effected by an "I Geraet 3" without guide beam, and on the three other missiles launched it was activated by "I Geraet 3" and guide beam. The "I Geraet 3", an integration unit , was not electrically charged. On the last mentioned three A-4s, the Soviet crew had inspected the integration unit , and it was therefore assumed that either Soviet tubes were installed or that the unit was even remodeled by them. The results obtained with these 3 instruments were not considered good, although no actual failures were involved. A definition to this statement could not be given. For two devices, the measuring data obtained by a Messina data transmitter were available. The German team achieved

satisfactory results with their integration units. Quick measurements and Soviet statements indicated that, except for the failures, 60 percent of the hits were exact with a dispersion of 1.5 x 1.5 km. The best hit was 500 meters to the side of the target. In 5 or 6 missiles, measuring instruments for cosmic radiation were allegedly installed by the Soviets. Except for the second, third and fifth test when the incidents occurred [redacted] 25X1
the striking point was visited by Soviets only.

13. The integration devices were sealed German products. This airborne instrument was to effect combustion cut off at a given maximum speed preset by "charging" the unit in accordance with the range. The unit also functioned as a speed governor by integrating the acceleration.

14. The fuel carried by a missile included about 5,000 liters of oxygen and about 4,200 liters of alcohol. The duration of burning was 61.5 seconds, the pressure in the combustion unit about 25 atmospheres and the thrust about 26 tons. All missiles launched at Kapustin were equipped with controls installed in the exhaust jet, which were Soviet products because there were not enough German controls available. They were made of a graphite like substance, pure graphite was allegedly not used, and had a mirror-finished surface. The jet control units of the crashed missiles were not burned. According to Soviet statements 100 kg of smoke generating explosive were fired.

15. Search airplanes reported the striking point of the A-4 and occasionally the dispersion, but never the target itself. Before the launching, the time, "x-20" was given by the Soviets, with the figure X for the calculated time of launching. Shortly afterwards Korolov reported that search aircraft were in the area of Lake Elton. It was not known from where these aircraft took off. The auxiliary landing field at Kapustin, a plane steppe without permanent installations, was allegedly used only by the visitors witnessing the launching process. The two or three search aircraft involved were never seen. It was possible that relay aircraft were cruising in the area of Lake Elton to observe the launching and to report it to other aircraft patrolling the target area, or that the aircraft took-off at time "x-20" in the direction of the target area where, flying at about 500 km/h, they would arrive in time.

16. After the launching program was completed, a small unit of personnel remained in Kapustin with the remaining 5 A-4's. Soviets statements indicated that another testing program with German experts was to be started there in 1948. The final report on the launching tests with the results obtained was completed in late January 1948. [redacted] the training status 25X1
of the Soviet personnel was still inadequate because the time available had been too short, and that one year would be required to train the personnel sufficiently. The Soviets demanded that each person be specialized for a certain manipulation, while the Germans 25X1
maintained that a more general training would be better. [redacted] 25X1

17. No information was obtained on the existence of other training or experimental rocket launching bases, nor was anything learned about further experiments with other types of rockets or other guided missiles at Kapustin. It was learned, however, that like at Branch Institute 1 experiments in the field of gas discharge were also conducted at a test stand in Kapustin.

18. Visitors at the Kapustin launching site included 10 to 15 high-ranking air force officers with a general, about 50 high-ranking navy officers with an admiral, the Minister of Armament who controlled Plant 88 and his staff, and experts in the field of rockets, ballistic and high frequency from technical institutes. All these persons were continuously present. Two marshalls, allegedly of the army escorted by a staff of about 10 officers visited Kapustin occasionally. Other unidentified commissions arrived by plane for short visits. Questions by the naval personnel about the possibility of launching a V-2 from ships were answered negatively.

Activities from 1948 to November 1953. 25X1

19. After the final report on the launching activities in Kapustin was completed, 25X1

experts visited Plant 25X1
No 88 to see the motion picture taken during the experiments at Kapustin. The films remained at Plant No 88.

20. under the supervision 25X1
of Dr. Umpfenbach (fnu), experiments were conducted on a gas tapping system. The gas taken from the combustion unit was cooled and used as propellant for the turbine. To accomplish these experiments, 25X1
a small test stand at Branch Institute No 1 for small combustion units with a thrust of up to 1 ton. The control stand was installed in a bunker. Alcohol was stored in three 250-liter fuel tanks 25X1
installed in a special room, while the oxygen required, produced by a plant-owned oxygen apparatus, was filled in a special pressure resistant tank. The governor units and measuring instruments were also installed in the bunker. The cooling water required for the combustion units was fed by a rotary pump. Small combustion units were constructed for the experiments to obtain data for the cooling of the gases, and also to test the R-10 turbine. Kerosine and alcohol were used as cooling agents. The project included about 600 experiments conducted according to special programs of about 25 experiments each. The gas temperatures in these experiments were 350, 450, 800 and 900 centigrades respectively. The mixing proportion varied with each experiment.

21. Since the manually adjusted temperature control units did not work accurately enough to keep a constant temperature of the gases and of the cooling system, an automatic govenor developed by Dr. Magnus (fnu) was used. After the tanks were filled and had reached the desired pressure, the ignition was switched on and subsequently the preliminary stages of oxygen and fuel were activated. The throttle valve remained still while the prevalve was opened. Then the main stages for oxygen and fuel and the main stage of the cooling system were switched on. As soon as the burner had adjusted itself to the data given, the prevalve was closed and the throttle flap was opened, which effected the gas flow to be exhausted through the nozzle. These experiments were continued until December 1951. A temperature gradient of the gas from 2,000 to 350 centigrades was achieved in these experiments.

Alcohol was found to be the best cooling agent. The rate of flow of the cooling agent applied was first 1.5 kg/sec which was later increased to 3 kg/sec. Dr. Ferchland (fnu) was in charge of the calculations. The pressure in the combustion units varied from 3 to 25 atmospheres.[2] Viebach prepared the basic material with about 150 sketches, scale 1 to 100, for a final study on gas discharge systems to be written by Professor Klose (fnu). The report was completed and turned over in May 1952.

22. At the test stand in Kaputnin, the experiments were to be conducted with A-4 combustion units which were converted for gas discharge. It was also planned that the R-10 type turbine be tested in connection with the gas discharge unit of the A-4. [redacted] testing program [redacted] included the following variations: 25X1 25X1

a. Immersion pipes, 150, 300 and 600 mm long.
b. Uncooled jet pipes, 2, 1.5, 1 and 0.5 m long.
c. Test without throttle flap and control valve, so that the uncooled nozzle be directly connected to the cooled unit.
d. Installation of an uncooled pipe, 2 m long, instead of a cooled part.
e. Direct connection of the nozzle to the elbow.
f. Installation of an uncooled elbow instead of a cooled one.
g. Experiments without gas mixer.

All these experiments were to be conducted with various rates of flow of the cooling agent.[3] Because the results of the experiments in Ostashkov could be used, the testing program for Kapustin included only 300 tests. The experiments with immersion pipes of 600 mm length, with the gas mixers and with the cooled pipe (see paragraph 22 d) could be eliminated. [redacted] these experiments, if conducted by German experts, would require a period of about 6 months but that the Soviets would require more time. 25X1

23. Experiments with the gas discharge unit in connection with the R-10 turbine were accomplished with working temperatures of up to 600 centigrades. Among other fuels, kerosene was used to drive the turbine. Fuel temperatures were taken from 350 to 600 centigrades. Ten different newly constructed head elements were used for the tests during which the oxygen side was of primary importance. Exchangeable and fixed oxygen nozzles were tried. Further cooling tests with water, Kerosene and alcohol were made. After 15 December 1951 the test stand was off limits to all Germans. In May 1952, the sketches of the gas experiments were turned over and the activities came to an end.

24. The Soviets apparently continued to work on the gas discharge system.

a. In May 1952, a burst pipe was sent from Moscow to Ostashkov. This pipe which allegedly burst in pressure tests showed however the effects of great heat. It was assumed that some sort of explosion was involved which might have occurred in connection with gas discharge tests.

b. Dranovski (fnu), a Soviet, took great interest in the gas experiments at Ostashkov, and Joffe (fnu) and Miskevich (fnu) also participated in these activities. Between 1950 and 1952 Dranovski was frequently absent from the island. When he returned from Kapustin in late 1952, [redacted] good results had been obtained in the experiments with gas discharge 25X1

units. [redacted] 25X1

[redacted] the throttle flaps of 1 T type rustproof steel stuck during further experiments. The quality of this steel was good, but too soft and difficult to turn. [redacted] the jammed throttle flaps were a result of high temperatures. 25X1

c. It was learned that experiments with Laval-type nozzles for new head elements had been conducted at the test stands during the first half of 1952. Between mid and late 1952, the experiments had to be discontinued because the oxygen plant did not function.

25. After most of the German experts had left Ostashkov [redacted] Dr. Umpfenbach's electric technical laboratory, [redacted] was ordered to develop a statoscope for aircraft for an altitude of 15,000 meters. Since no basic records and requirements for this project were given, it was assumed that this order was merely given to keep the Germans occupied. Other departments included the Electron Department with Groettrup, Wohlfahrt (fnu), Becher (fnu), Dr. Erler (fnu), Professor Schmidt (fnu) and Neumann (fnu), furthermore the Zeiss Construction Group with Kiselov (fnu) as Soviet chief and Hans Wittich as German chief, and the Junkers Construction Group with Soviet chief Austrum (fnu) and Dubnach (fnu) as chief of the construction section. 25X1

Soviet Construction of A-4 Missiles and Other Projects.

26. It was believed that the Soviets produced parts of the A-4. In 1950 or 1951 when oxygen pipes were needed, the parts received were Soviet products.

27. In the fall of 1948, the drawings of the R-10 turbine were turned over to the Soviets, who subsequently ordered the material to be worked over for construction sketches for the production. This project was completed in late 1949. One set of records remained at Branch Institute No 1. When further inquires about the project were received from the Soviets, during 1950 and 1951, it was assumed that the serious evaluation work of the detailed sketches or a production of the R-10 turbine was involved.

28. In 1951 Rudolf Mueller, an expert for statics, worked on experiments with "cantilever containers.". He used small units for these experiments which in the beginning encountered serious difficulties. After several experimental models burst, the tanks were reinforced and satisfactory results were obtained. The electric welder Scholz (fnu) took an important part in these activities. [redacted] 25X1

[redacted] Rather than the R-10, the Soviets would produce an improved version of the A-4 equipped with gas discharge unit in combination with the R-10 turbine and with enlarged tanks achieved by better utilization of the space available. 25X1

29. [redacted] construction of an experimental combustion unit with a throughput of about 3 kg and a thrust of 1 ton for the R-14. Equipped with the Blasig type servo unit with jet pipe, the set-up was used in experiments for the steering of the R-14 by means of "tiltable combustion unit". In November and December 1951, about 20 experiments were conducted with a burning period of 90 seconds, in order to determine the effects of the combustion process on servo and combustion units. The experiments had satisfactory results. Dr. Ferchland (fnu) and Dr. Umpfenbach were primarily in charge of this project. 25X1

[redacted] 25X1

30. After August 1952, the German group in Ostashkov was controlled by the Air Ministry, while the Soviet testing department was still a part of Plant No 88 and, therefore, controlled by the Ministry of Armament and Ammunition.

1. Comment. For a location sketch of the experimental launching base at Kapustin, see Annex 1. 25X1

2. Comment. For a sketch of the switching system of the test stand for gas discharge experiments, see Annex 2. 25X1

3. Comment. For a circuit diagram of the test stand for gas discharge tests at Kapustin, see Annex 3. 25X1

4. Comment. For a list of Soviet experts see Annex 4. 25X1

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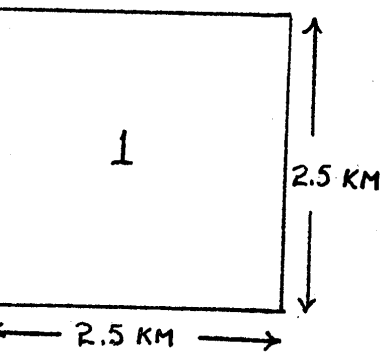
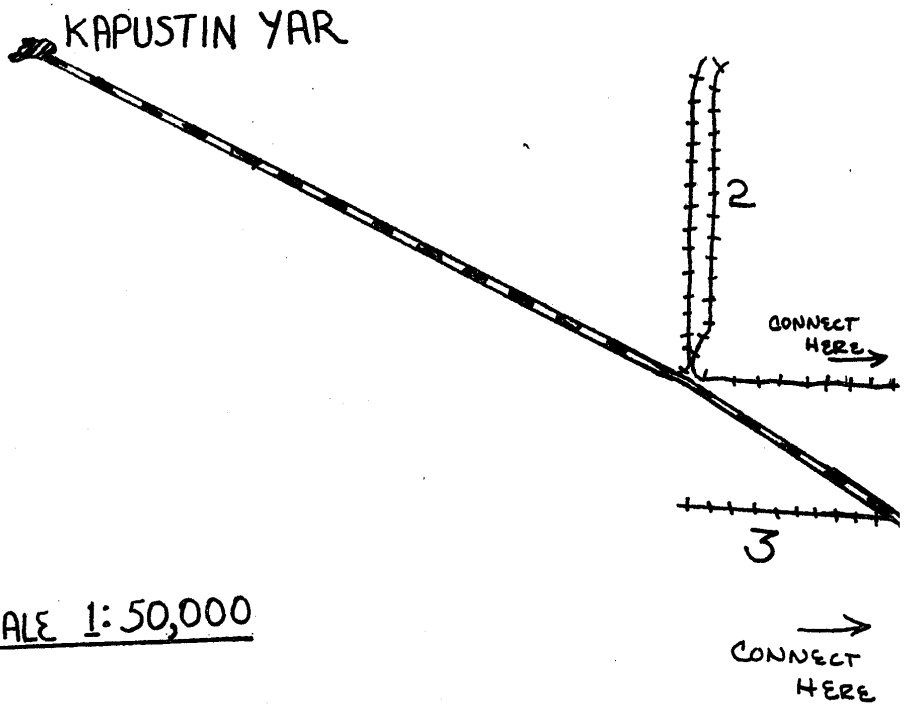
Sketch No. 1
Location of Experimental Launching Site of KAPUSTIN YAR





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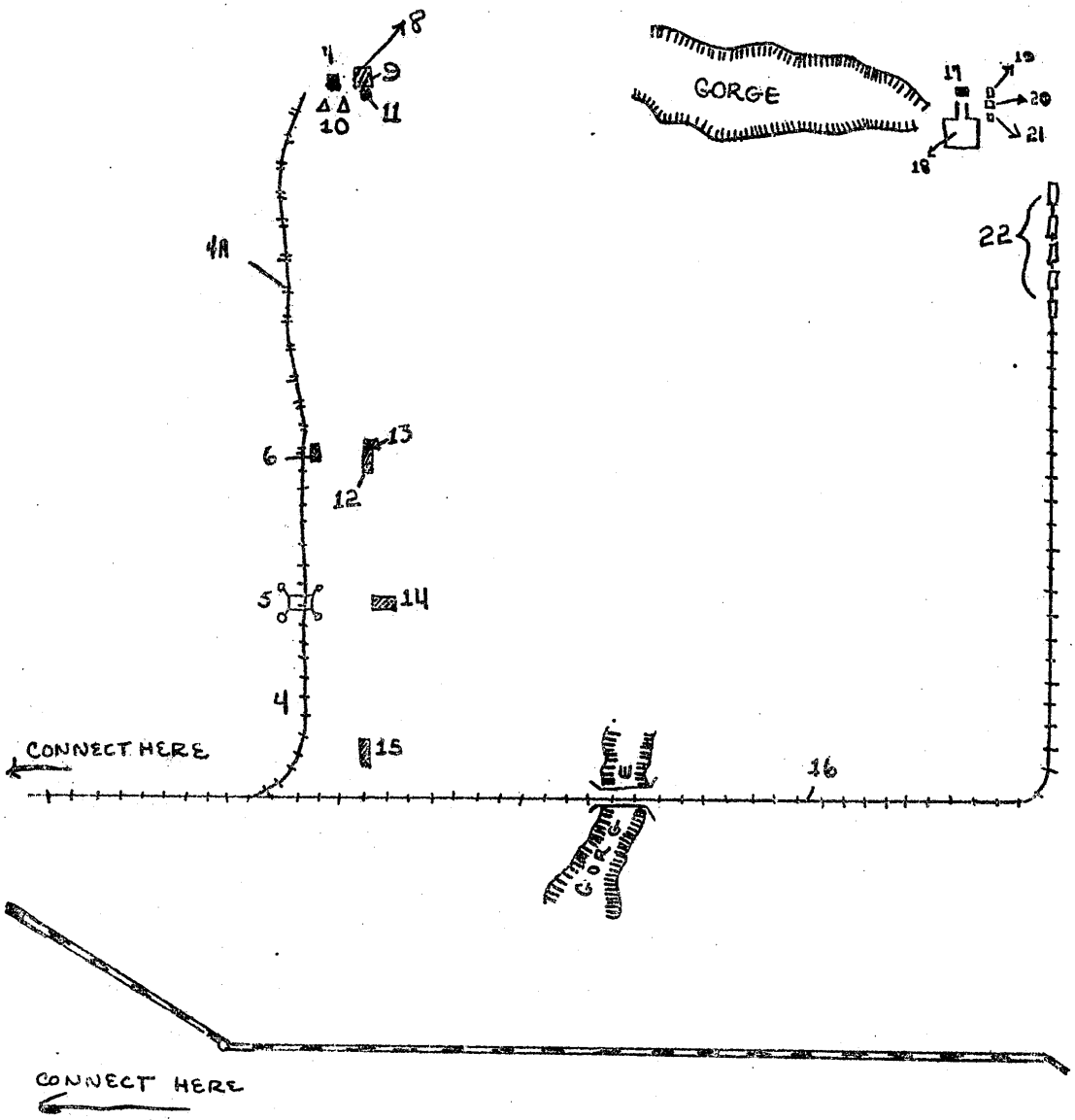
Sketch No. 1 (continued)
Location of Experimental Launching Site of KAPUSTIN YAR



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Annex 1 [redacted]

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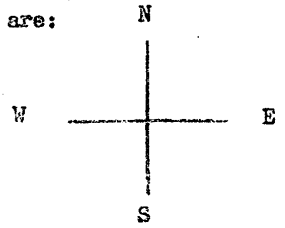
Location and Layout Sketch of the Kapustin Experimental Launching Base.

The cardinal points on the sketch are:



1 Airfield

2 Side track for FMS I and II

3 Railroad connection with equipment from Peenemuende piled up at both sides

4 Connecting track

4a Planned railroad connection

5 Strabo type transport crane

6 Storage shed with accessories, about 6 x 27 m

7 Fire control tank

8 Firing direction, about 30 degrees, passing west of Lake Elton

9 Concrete launching table, 25 x 25 m

10 Two tents for ten men each of the operational personnel

11 Korolov's control bunker

12 Test station for two A-4 units, brick building, 15 x 50 m

13 Technical office

14 Three-story apartment house, 12 x 30 m

15 Hangar for special vehicles (ground equipment, about 15 x 70 m)

16 Spur track to test stand

17 Test stand, steel frame with concrete filling, about 30 m high

18 Concrete apron

19 Control bunker, concrete structure, 9 x 3.5 m and 2.2 m high, with three observation slits of bullet proof glass

20 Stationary power plant, brick building 3 x 6 m, with American 75 kVA generator, covered with earth

[redacted]

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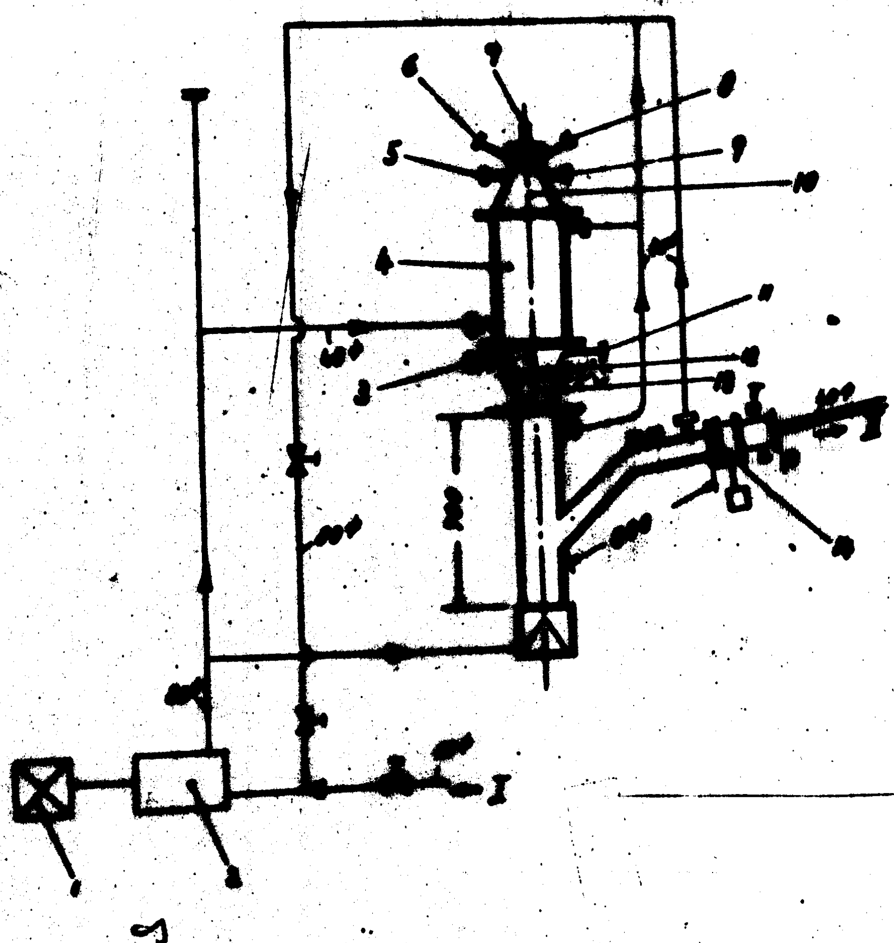
21 Water works and pumping station for fire extinguishing equipment. Underground installation.

22 Repair cars

Sketch No. 2
[illegible] Switching Diagram of Test Stand for Gas Discharge Experiments



Annex 2

Switching Diagram of Test Stand for Gas Discharge Experiments

Legend:

1 Engine

2 Pump for cooling water

3 Cooling agent, main stage

4 Combustion unit, 200 mm diamter, 700 mm long

5 Fuel, main stage

6 Main oxygen stage with injection pressure

7 Ignition

8 Oxygen, preliminary stage

9 Fuel, preliminary stage

10 Head unit, throughout about 3 kg

11 Cooling agent, main stage

12 Cooling vessels, throughput about 2.5 to 3.5 kg

13 Connecting piece

14 Throttle flap

I From the mains

II To the turbine

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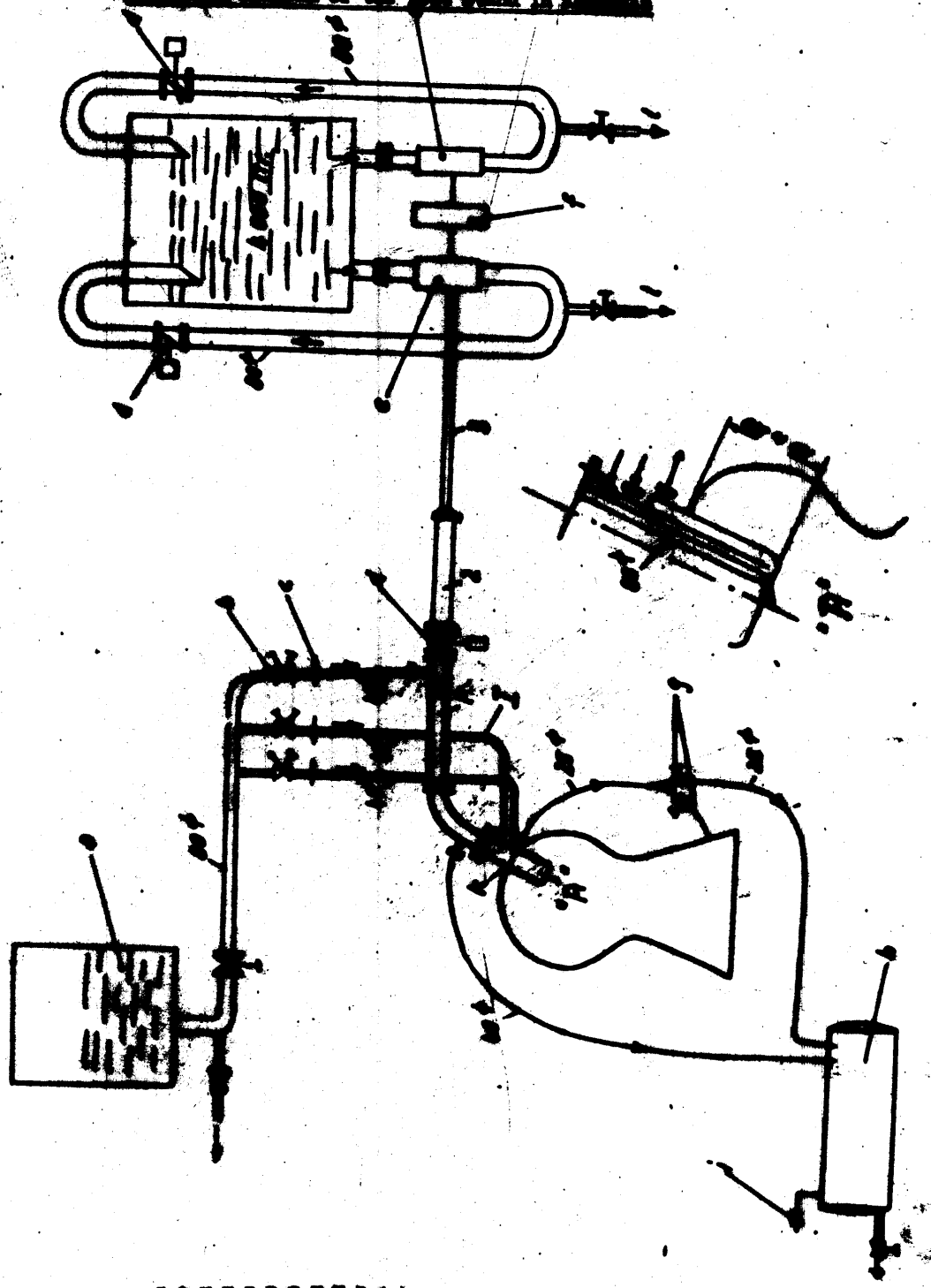
Sketch No. 1
Schematic Diagram of the Test Stand in Kiruna



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Annex 3

Switching Diagram of the Test Stand in Kapustin .

Legend:

a Tank for colling agent, 1,000 liters

b Control valves

c Shutters

d Throttle flaps

e Pumps

f A-4 or R-10 type turbine

g Cut off valve

h Collecting vessel

i Ventilator

k Immersion tube (see dailed sketch "A")

l Discharge

I Throughput about 3,5 to 5 kg/sec

1 cooled pipe, 2 m long

2 Uncooled pipe, 2 m long

3 Uncooled part, about 1,2 m long

The cooled gas had a temperature of about 450 centigrades

Annex 4

List and Description of Soviet Personnel.

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[redacted]

There was a total of about 400 Soviets living on the island. Among them were about 50 engineer and 100 mechanics, the others were unskilled laborers. In the Summer of 1952, only about 200 Soviets were left there. Rumors indicated that the island was to become a rest center.

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